CLUTCHES AND ASSOCIATED RACKS
PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of panel clutches and racks. It also covers approved procedures for replacing these parts.

1.02 This section is reissued to change the piece-part information for the terminal block mounting screws and to include information for replacing the pawl bracket. Detailed reasons for reissue will be found at the end of the section.

1.03 Part 2 of this section covers the piece-part numbers and the corresponding names of the parts which it is practicable to replace in the field in the maintenance of panel clutches and racks. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Piece-part Data.

1.04 Part 3 of this section covers the approved procedures for the replacement of the parts covered in Part 2. This information is called Replacement Procedures.

1.05 Make-busy Information: In general, before making replacements of any part of the apparatus covered herein, make the associated circuit busy in the approved manner.

2. PIECE-PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of the apparatus. The piece-part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company Merchandise Department. When these names differ from those in general use in the field, the latter names, in some cases, are shown in parentheses.

2.02 When ordering piece parts for replacement purposes, give both the number and name of the piece part. For example: P-111869 Screw. Do not refer to the BSP number or to any information shown in parentheses following the piece-part numbers.

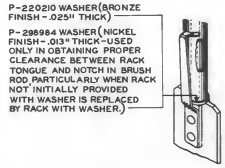

Fig. 1 - Rack Bearing Washer

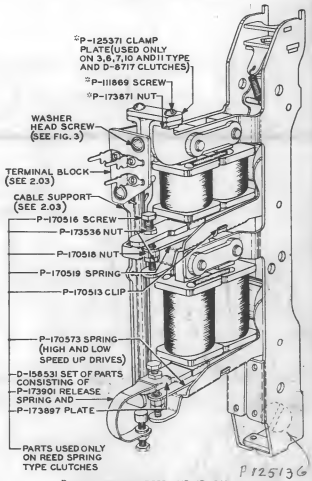

Fig. 2 - Reed Spring Type Clutch

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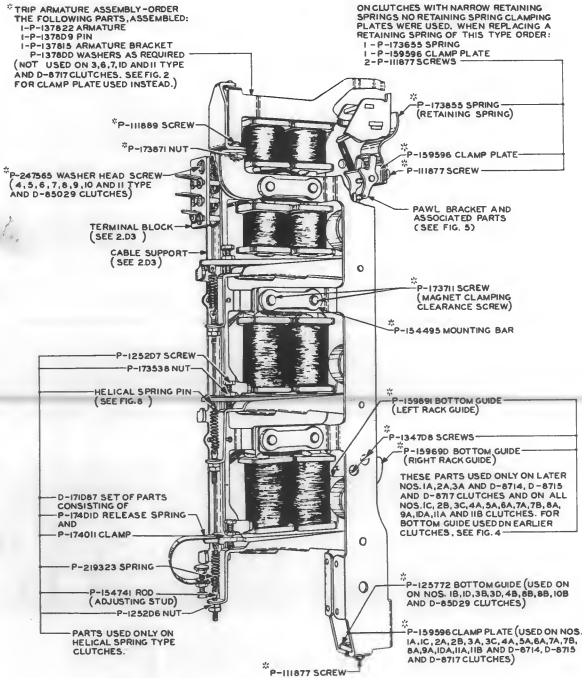

Fig. 3 - Helical Spring Type Clutch

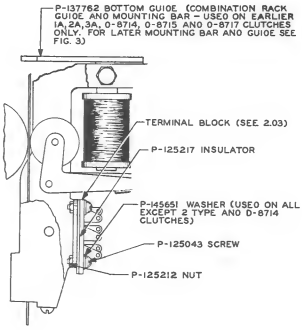

Fig. 4 - Parts Used Only on Earlier 1-, 2-, and 3-type and D-8714, D-8715, D-8717, and D-85029 Clutches

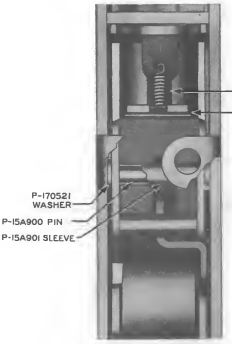

Fig. 5 - Pawl Bracket and Associated Parts

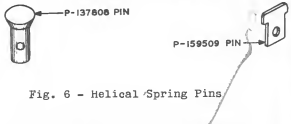

Fig. 6 - Helical Spring Pins

2.03 The following is a list of numbers and corresponding names of piece parts which are not common to all clutches.

Clutch Code No.	Type of Clutch	Location of Terminal Block	Terminal Block Number	Cable Support Number
1A	Helical	Bottom	P-173525	P-137774
1B	Helical	Bottom	P-173525	P-137774
1C	Reed	Bottom	P-173525	P-137774
1D	Reed	Bottom	P-173525	P-137774
2A	Helical	Bottom	P-173526	P-137775
2B	Reed	Bottom	P-173526	P-137775
3A	Helical	Bottom	P-173527	P-137774
3B	Helical	Bottom	P-173527	P-137774
3C	Reed	Bottom	P-173527	P-137774
3D	Reed	Bottom	P-173527	P-137774
4A	Helical	Top	P-172025	P-172022
4B	Helical	Top	P-172025	P-172022
5A	Helical	Top	P-172032	P-172030
6A	Helical	Top	P-172034	P-172022
6B	Helical	Top	P-172034	P-172022
7A	Helical	Top	P-172034	P-172030
7B	Helical	Top	P-172034	P-172907
8A	Reed	Top	P-172025	P-170511
8B	Reed	Top	P-172025	P-170511
9A	Reed	Top	P-172032	P-170512
10A	Reed	Top	P-172034	P-170511
10B	Reed	Top	P-172034	P-170511
11A	Reed	Top	P-172034	P-170512
11B	Reed	Top	P-172034	P-170511
*D-8714	Helical	Bottom	P-173526	P-137775
*D-8715	Helical	Bottom	P-173525	P-137774
*D-8717	Helical	Bottom	P-173527	P-137774
D-85029	Helical	Bottom	P-173525	P-172022

*See 3.33 for replacement information for these clutches.

3. REPLACEMENT PROCEDURES

3.01 List of Tools, Gauges, and Materials

Code or Spec No.	Description
Tools	
310B (2 reqd)	9/32-in. Hex. Open Double-end Offset Wrench
467A	9/32-in. Hex. Open Double-end Flat Wrench
KS-2631	4-1/2-in. Screwdriver
KS-8097	5/8-in. and 7/16-in. 12-point Offset Box Wrench
-	5-in. Diagonal Pliers
-	6-1/2-in. P-long-nose Pliers
-	4-in. Regular Screwdriver
-	Wedge
-	7/16-in. and 1/2-in. 12-point Box Offset Wrench (J. H. Williams & Co, No. 8725 Superrench)
Gauges	
KS-6909	Thickness Gauge Nest
Materials	
-	No. 6 Lock Stitch Lacing
-	Piece of No. 16 Bare Wire

3.02 No. 467A Wrench: In these procedures, the No. 310B wrench is specified for use on the clutch adjusting screws and adjusting nuts. In case the opening of the No. 310B wrench is too small to fit the screws or nuts, use the No. 467A wrench instead of the No. 310B wrench.

3.03 After making any replacement of parts of panel clutches or racks, the part or parts replaced shall meet the readjust requirements involved as specified in the section covering this apparatus. Other parts whose adjustments have been disturbed by the replacing operations shall be checked to the readjust requirements and an over-all operation check shall be made of the apparatus before restoring the circuit to service.

3.04 No replacement procedures are specified for screws and other parts where the procedure consists of a simple operation.

3.05 To replace most of the parts covered in this section, it will be necessary to first remove the rack from the clutch and then to remove the clutch from its position on the selector frame as outlined in the section covering the particular type of clutches and racks involved, and place the clutch on the guard rail.

3.06 Retaining Spring and Retaining Spring Clamping Plate: Remove the retaining spring by removing the retaining spring mounting screws with the 4-inch regular screwdriver. On the later design retaining springs, the removal of the screws will also release the clamping plate. In reassembling the retaining spring and associated parts, it will be helpful to hold the clamping plate in position by means of the P-long-nose pliers, the wedge, or by inserting the rack into the loose clutch between the rack guides and, with the clutch and rack held horizontally, use the rack to support the clamping plate and retaining spring.

3.07 Trip Armature Assembly: To replace the trip armature, remove the screws holding the assembly to the clutch frame with the 4-inch regular screwdriver. If necessary, hold the locknuts with the No. 310B wrench.

Terminal Block

3.08 Unsolder the wires from the clutch terminals.

3.09 Remove the terminal block mounting screws with the 4-inch regular screwdriver. On clutches on which the terminal block is located at the bottom, it may be necessary to hold the nuts with the P-long-nose pliers when loosening the screws holding the terminal block to the clutch frame. The removal of these screws frees the terminal block assembly and the insulator if the clutch is equipped with one.

3.10 If the terminal block is to be replaced, unsolder the leads to the magnets and transfer them to the new terminal block, taking care to solder them to the proper terminals. When replacing terminal blocks, make sure that washers are placed beneath the heads of the screws which fasten the terminal →blocks to the frames on 1- and 3-type and →D-8715, D-8717, and D-85029 clutches. Washers are not used on 2-type and D-8714 clutches because of the possibility of a short circuit between such a washer and the upper right-hand terminal. Tighten the screws securely, using the P-long-nose pliers to hold the nuts on clutches so equipped. Resolder the wires to the clutch terminals.

Mounting Bar and Combination Rack Guide and Mounting Bar

3.11 Remove the magnet clamping screws with the KS-8097 wrench as shown in Fig. 7. On some earlier clutches it will be necessary to use the Williams superrench to loosen the magnet clamping screws. Substitute the new part and retighten the magnet clamping screws just sufficiently to hold the magnets in position.

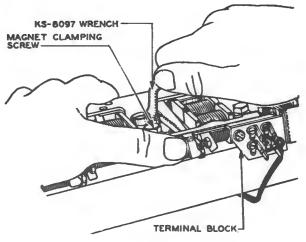

Fig. 7 - Method of Loosening Magnet Clamping Screw

3.12 Manually operate the updrive or downdrive armature and make sure that the face of the core of the front magnet is parallel to the surface of the armature nonmagnetic plate. Then check the clearance between the armature and the core of the magnet nearer the fulcrum with the KS-6909 gauge. On reed spring type clutches it may be necessary to loosen the reed spring adjusting screw locknut with the No. 310B wrench and turn the adjusting screw toward the roller arm in order to gauge this clearance without interference between the gauge and roller arm. This clearance should not be less than 0.010 inch. Ordinarily this clearance should be as near 0.010 inch as practicable, as this will insure that a minimum effort will be required in readjusting the clutch updrive and downdrive.

3.13 If this clearance is appreciably greater than 0.010 inch, lower the rear magnet or raise the front magnet. In making this adjustment, reduce the clearance as much as possible (without going below 0.010 inch). This adjustment may be facilitated by placing the 0.012-inch blade of the KS-6909 gauge between the armature and the core of the rear magnet and lowering the rear magnet or raising the front magnet until the gauge is tight. Check that the face of the rear magnet core is parallel to the surface of the armature, and recheck that the face of the core of the front magnet is parallel to the surface of the nonmagnetic plate. Then securely retighten the magnet clamping screws, applying enough force to insure that the magnets will not be jarred out of position during service. Then recheck the clearance between the core of the rear magnet and armature to be sure that it is not less than 0.010 inch with the armature manually operated. On updrives, in some cases, it will be necessary to remove the old rear magnet clamping screw and substitute a clearance screw in order to reduce this clearance sufficiently to meet the requirements specified for this apparatus in the section for the particular type of clutches involved.

Cable Support

3.14 On 4-, 5-, 6-, 7-, 8-, 9-, 10-, and 11-type clutches, remove the terminal block from the cable support as outlined in 3.09.

3.15 Cut the lock stitch lacing, which holds the local cable form to the cable support, with the diagonal pliers. If the local cable is held to the cable support by a wire clip, remove the clip with the P-long-nose pliers.

3.16 Spread the wires that lie close to the heads of the magnet clamping screws which hold the cable support to the clutch frame. Remove these screws with the KS-8097 wrench as shown in Fig. 7. On some earlier clutches, it will be necessary to use the Williams superrench to loosen the magnet clamping screws. Then lift out the cable support, taking care not to damage the wires of the clutch local cable form.

3.17 When replacing the cable support on 4-, 5-, 6-, 8-, 9-, 10-, and 11-type clutches, place the top lock stitch lacing or wire clip in place before putting the cable support in position. When placing the cable support in position on 4-, 5- and 6-type clutches, make sure that the small prong at the top of the cable support makes contact with the horizontal flange of the clutch frame.

3.18 In reassembling the cable support on the clutch, make sure that the updrive and downdrive armatures adequately clear the cable support. Also, since the magnet further from the fulcrum may have been shifted, position the front magnet as covered in 3.12 and 3.13.

Pawl Bracket

3.19 To replace a pawl bracket, proceed as outlined in Section 026-115-811.

Helical Spring and Associated Parts - Helical Spring Type Clutches Only

3.20 To replace a release spring on the updrive or any of the following parts associated with the helical spring, loosen the screw gap adjusting screw locknut with a No. 310B wrench and remove the release spring and clamping plate.

3.21 Remove the adjusting and locknuts from the adjusting stud with two No. 310B wrenches as shown in Fig. 8, and remove the adjusting stud from the roller arm.

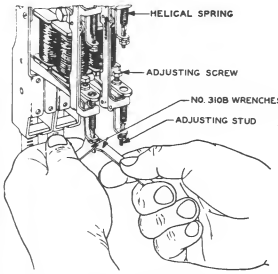

Fig. 8 - Method of Replacing Adjusting and Locknuts

3.22 Remove the helical spring from the helical spring pin with the P-long-nose pliers, taking care not to bend the spring more than necessary. Detach the other end of the helical spring from the adjusting stud with the P-long-nose pliers.

3.23 Substitute the new part. Connect the adjusting stud to the helical spring and then attach the other end of the helical spring to the helical spring pin. Bend the ends of the helical spring in place with the P-long-nose pliers and then remount the adjusting stud and nuts.

3.24 After substituting the new parts, remount the release spring, if provided, as outlined in the section covering the apparatus.

Reed Spring and Associated Parts - Reed Spring Type Clutches Only

3.25 To replace a release spring on the updrive or any of the following parts associated with the reed spring, loosen the screw gap adjusting screw locknut with a No. 310B wrench and remove the release spring and clamping plate.

3.26 Loosen the adjusting nuts with the No. 310B wrenches in a manner similar to that shown in Fig. 8. Then turn the adjusting screw sufficiently to remove the nuts.

3.27 If the clutch is mounted on the frame and the reed spring is to be replaced, push a piece of No. 16 bare wire under the left end of the clip to hold the clip in place after the spring is removed.

3.28 One side of the reed spring has a character stamped on it. Assemble the reed spring in the clutch so that the side which has the character stamped on it is downward, using the piece of wire to raise the clip to permit placing the spring beneath the clip.

3.29 In replacing the clip, note that the edges on one side of the clip are sharp or burred while the edges on the other side are more rounded. The clip should be assembled with the burr side away from the reed spring.

3.30 After substituting the new parts, remount the release spring, if provided, as outlined in the section covering the apparatus.

Rack Guides (Right and Left)

3.31 Remove the screws holding the rack guides in place with the KS-2631 screwdriver. This will free the guides for replacement.

Bottom Guide or Clamp Plate

3.32 To effect the replacements of either of these parts, remove the screws holding the bottom guide or clamp plate to the clutch frame with the 4-inch regular screwdriver.

D-8714, D-8715, and D-8717 Clutches

3.33 These clutches have been replaced by coded clutches as follows:

D Spec No.	Code No. of Replacing Clutch
D-8714	2B
D-8715	1C
D-8717	3C

When a D-8714, D-8715, or D-8717 clutch is to be replaced by a coded clutch, note that external resistors were connected across the terminal of one or more of the magnets. On the new clutch, the resistances are part of the magnets and hence the leads to the external resistors should not be connected to the clutch. The leads to these resistors may therefore be cut off or taped up as required, noting however, that in some cases battery may have been connected directly to the resistor.

REASONS FOR REISSUE

1. To revise the piece-part data for the terminal block mounting screws (Fig. 2).
2. To revise the piece-part data for the bottom clamp plate (Fig. 3).
3. To revise the piece-part data for the washer (Fig. 4).
4. To add piece-part data for the pawl bracket and associated parts (Fig. 5).
5. To revise the procedure for replacing the terminal block (3.10).
6. To add a procedure for replacing the pawl bracket (3.19).